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TITLE

EXAMINATION OF TREATED TREES ON THE
LYNCH LAKE CONTROL PROJECT
MOUNTAIN PINE BEETLE IN LODGEPOLE PINE

Forest Insect Laboratory
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SUBJECT—

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Examination of Treated Trees on the Lynch Lake Control Project Mountain Pine Beetle in Lodgepole Pine - 1951[1]/

In the spring of 1951 a control project was conducted near Lynch Lake on the Pleasant Valley River drainage resulting in the treatment of about 1,250 mountain-pine-beetle-infested lodgepole pine. Infested trees were treated standing with a 5 to 1 Diesel oil - orthodichlorobenzene spray, the project being completed on May 18. In the fall of 1951 a post-control survey revealed about the same number of attacked trees on the area treated. What was the origin of the beetles which attacked these trees? It was in the search for the answer to that question that an examination was projected for the area. The possibilities of reinfestation were considered to be as follows:

(1) Emergence from the treated trees due to spraying too lightly, with consequent partial control, (2) to untreated spots and streaks missed in the course of treating, (3) to failure to spray to the upper limits of infested lengths within the capacity of the spraying equipment, (4) to height of infestation being too great for equipment to reach in standing trees, (5) to failure of ordinary spraying procedure to completely control broods under the extremely thick bark characteristic of the lower bole on trees in this area.

Preceding conditions are concerned with tree treatment and characteristics. In addition there is the possibility of entire trees being missed in sufficient numbers to maintain an outbreak, especially if ratio of emerging insects to number attacking is high.

A further possibility is influx of beetles from scattered infested trees in both mixed and pure lodgepole pine timber types near the treated area. It was decided to check the first five possibilities by an examination of the control area and trees sprayed. Accordingly on October 25, Messrs. Evenden, Johnson, Terrell, Trostle and Gibson of the Forest Insect Laboratory, and Messrs. Ahlskog, Oakes and Albert of the Kootenai National Forest visited the area. This "crew" felled and examined twenty-six trees on various parts of the control area. Of the trees felled one had been a demonstration tree, sprayed at the start of the project as part of the training program for treaters. A second tree had been infested only by Ips species and a third was missed by the treating crews. Excluding the latter two, left twenty-four trees on which to base conclusions.

After felling, data pertinent to the treatment was obtained. A measure of treatment effectiveness as indicated by dead brood and emergence holes

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1/ Prepared by Archie L. Gibson, Entomologist

was sought on each tree examined. Where emergence of brood had occurred the cambium was examined for evidence of spraying as indicated by odor and appearance of the bark. The comparatively long period between treatment and time of this examination made it quite difficult to determine whether spray had or had not been applied. For the same reason boundaries of the sprayed area were not only difficult but at times impossible to locate. Some dead insects, whose appearance indicated they were killed by an oil-base spray, were noted under bark having neither appearance nor odor of having been treated. In contrast, from some bark areas where spray odor could be detected, some insects had survived and emerged. Thus there were additional occasions where exact boundaries between sprayed and unsprayed areas could only be approximated.

Heights of attack and treatment, diameter breast high, general notes on bark character and thickness, and on emergence of survivors wherever they were noted, were taken. In the latter category, emergence was classified as none, very light, light, medium, and heavy, with designation as to the area to which it was limited where such references were pertinent. Degree of emergence was the collective opinion of the members of the "crew" doing the bark sampling.

Selection of the twenty-four trees forming the basis for conclusions was such that a representative sample of the entire infested area could be expected. However, these trees were larger than the average infested trees treated on the project. Thus the data would be above average for infested lengths and untreated bole, and exaggerated for brood survival.

It is believed a reasonably accurate picture of control effectiveness was obtained in spite of the limitations imposed on the data by the conditions discussed.

Some of the data from the trees examined are given in Table I.

Table I. Data from mountain-pine-beetle-infested lodgepole pine treated on the Lynch Lake control project, 1951.

D.B.H. Class	No. of Trees	Total Infested Length In DBH Class	Treated	Untreated	Percent Brood Surviving	Remarks
7	1	27	15	12	23	Heavy emergence from under thick bark at base.
8	1	15	15	--	--	
9	3	40	40	--	--	
10	3	46	38	8	1	Emergence chiefly from areas covered by extremely thick bark.
11	4	114	75	39	3	Some emergence from under thick treated bark. Attacked length 51 feet on one tree.
12	2	62	42	20	5	Attacked length 42 feet on one tree.
13	1	20	20	--	--	
14	1	39	25	14	12	Strip untreated on lower bole.
15	1	50	21	29	26	Emergence light above treated area.
16	3	105	71	34	8	One tree had 53 infested length. Heavy emergence in and above treated area.
17	1	47	27	20	13	Heavy emergence above treated portion.
18	2	79	39	40	9	One tree attacked to 50 feet.
21	1	39	21	18	6	
Totals & Averages	24	683	449	234	6(1)	

(1) This is a weighted value and represents the brood believed to have emerged from treated trees.

Indicated untreated infested length amounts to 35 percent of the total as shown in Table I. Brood concentration in this upper portion of the infested length is usually low, however, and the percent surviving could not have been over 6 percent of total tree contents, judging from data from past studies. Status of emergence from treated and untreated portions of the trees examined is shown in the following tabulation:

Treated Lodgepole Pine Felled and Examined
on Lynch Lake Control Project - 1951

Mountain Pine Beetle Emergence									
In Treated Portion					Above Treated Portion				
None	Very Light	Light	Med.	Heavy	None	Very Light	Light	Med.	Heavy
13	4	4	--	2	9	1	2	1	2

Emergence from the treated areas was due to protection afforded by extremely thick bark at the base of some trees and to untreated or insufficiently sprayed spots and strips.

Having reduced the possibility of reinfestation being due to emergence from treated trees to a minor factor, we find it necessary to look elsewhere for an explanation of the reinfestation. A check of the area following control by T. T. Terrell and reported in a memorandum of June 4, 1951, revealed 223 trees had been examined. Of these, five had been poorly treated. In addition five trees had been missed. For the two examinations, missed and poorly treated trees equal about five percent of the total examined. It was the feeling of all concerned in the examination that only a small amount of reinfestation could have resulted from broods emerging from trees on the control area.

In the mixed timber types adjoining the control project area, more or less lodgepole pine was present. Any infestation in this light volume of susceptible timber would probably have been ignored as being too light to warrant treatment. Broods from untreated trees in such types could have been attracted to the control area. In addition there is an endemic infestation in the extensive lodgepole stands of the vicinity. Presence of the outbreak on the control area indicated it was attractive to the mountain pine beetle, a condition which probably persisted in 1952 and could have caused a further influx of beetles during that season. A further possible source of reinfestation might be the high ratio of emergence of new adults to their attacking parents. When some penetrating spray tests were being conducted in the spring and early summer on the Lynch Lake control project it was found that the infesting broods were unusually heavy right up to the time of emergence. Potential emergence

of new adults per square foot, immediately prior to emergence was over 50 to the square foot. Thus any emergence from untreated bark areas and trees would probably be decidedly in excess of the number attacking.

CONCLUSIONS

Individually, none of the factors discussed could be considered as the sole source of the reinfestation but with lightly treated spots, untreated spots and streaks, infested areas unsprayed above the treated portion, unusually thick bark permitting some survival at the base of treated trees, and a few missed trees, there are five known sources of reinfestation. In addition, nearby and even fairly distant supplies of beetles, known to have been present in both the mixed type and the pure lodgepole pine stands of the surrounding area, could have been attracted to and contributed materially to the aggregate reinfestation. The high indicated emergence merely emphasizes the possibility of each of these ordinarily minor factors contributing to the observed heavy reinfestation.